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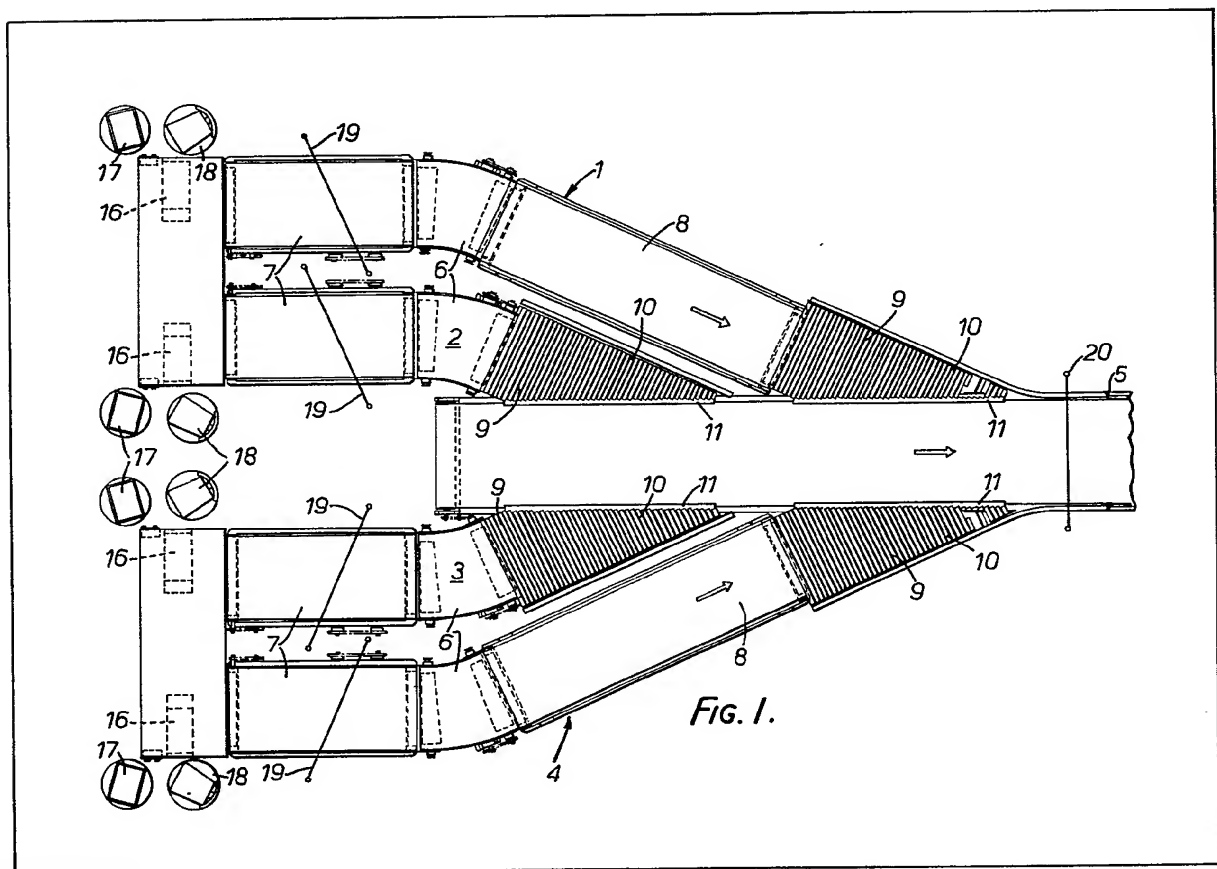
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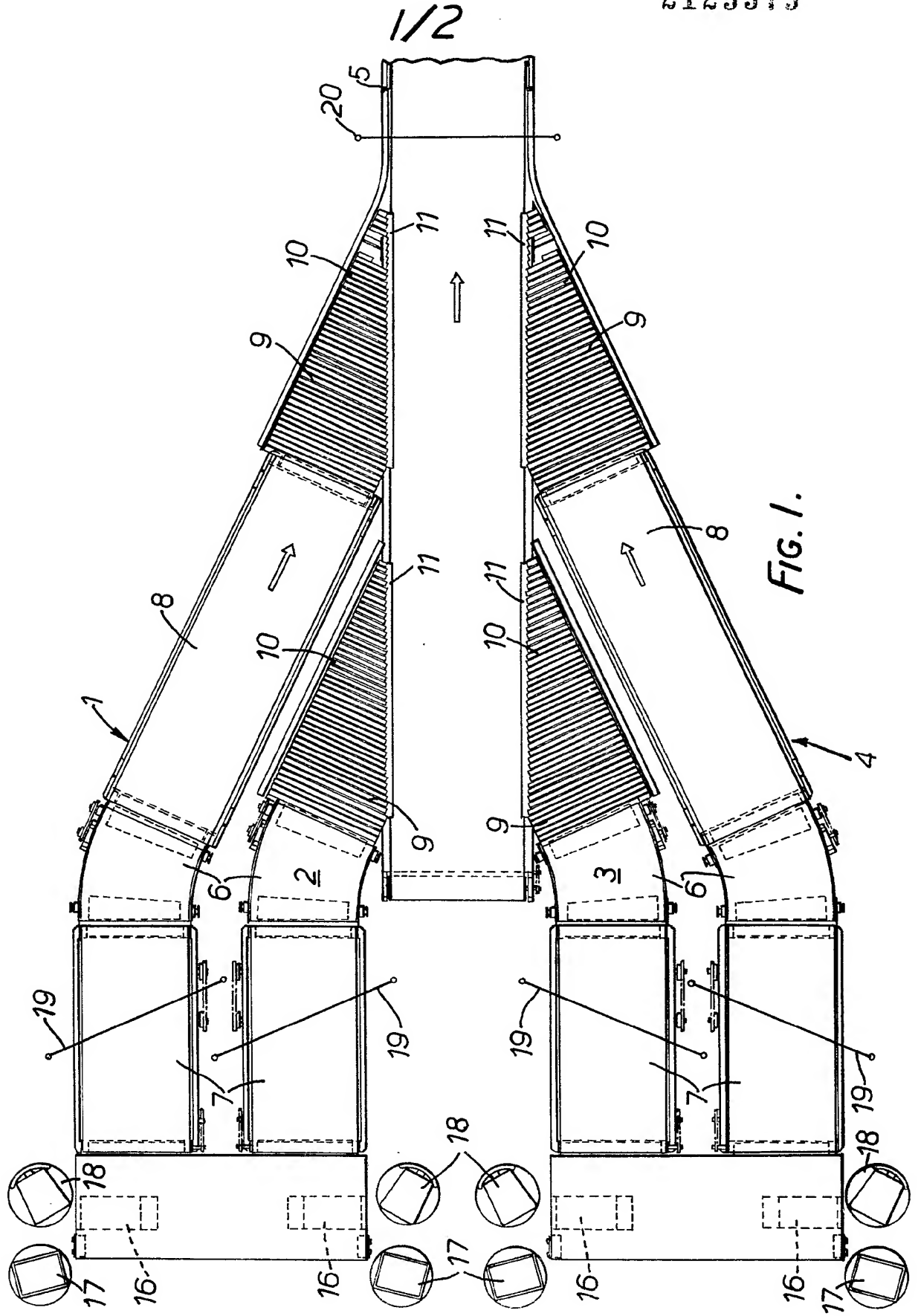
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(54) Improved conveyor feeding device

(57) A feeding device for feeding articles to the main conveyor (5) of a sorting system comprises at least two feed conveyors (1, 2, 3 or 4) merging with the conveyor (5). Each feed conveyor incorporates a loading section (7) provided with a detector (19) responsive to the passage of articles through the loading section. The detectors (19) operate to allow the passage of only one article past a detector at any one time and the detection zone of each detector extends across the associated loading section at an angle such that the time taken for an article leaving the detection zone to reach a zone extending normally across the main conveyor is substantially the same irrespective of the lateral position of the article on the feed conveyor.





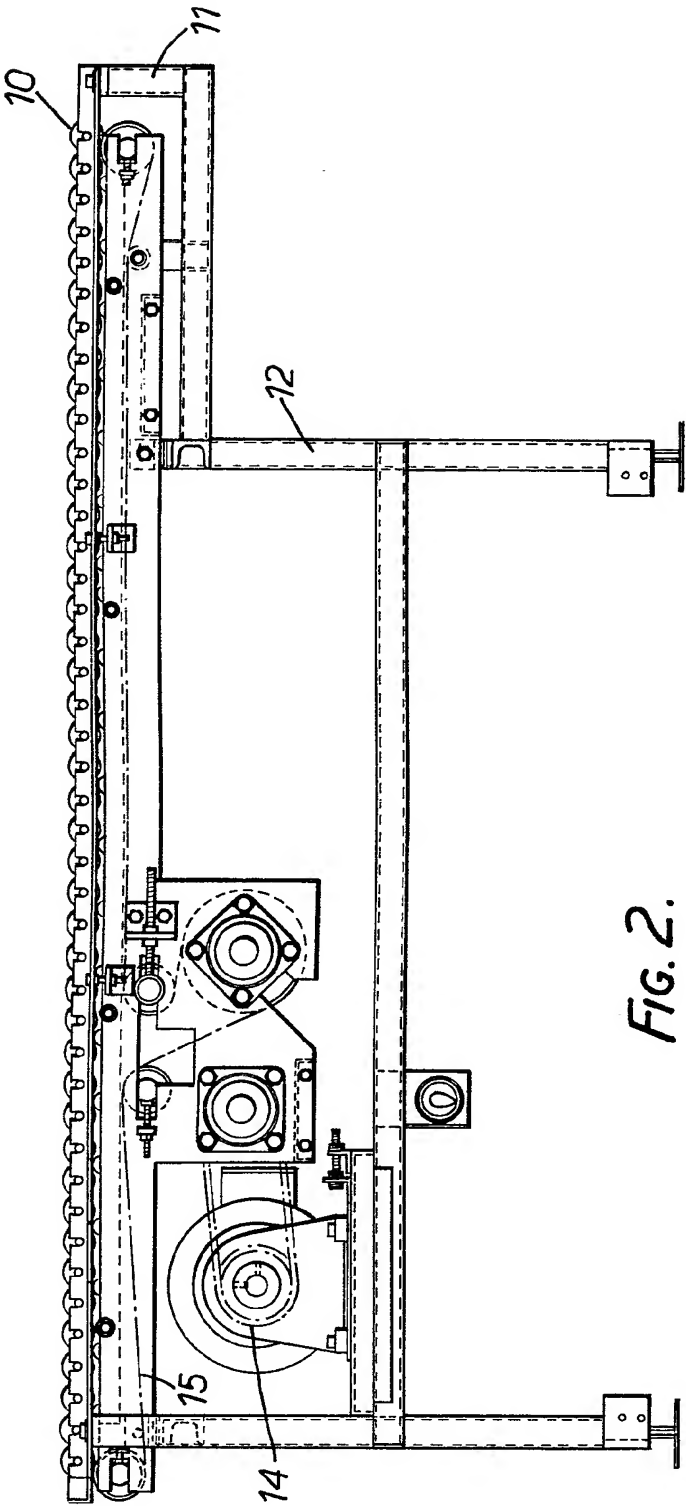


FIG. 2.

SPECIFICATION

Improved conveyor feeding device

5 This invention relates to a feeding device for feeding articles to the main conveyor of a conveyor sorting system.

Known such systems for use in sorting post parcels have a plurality of discharge positions located along the length of the conveyor at which the parcels carried by the conveyor may be discharged. Each parcel is discharged at a discharge position according to the destination of the particular parcel and under the control of a controller into which a code indicative of that destination is fed.

In one particular form the conveyor is made up of an effective endless belt of transverse slats with each parcel occupying as many slats as the length of the parcel requires and means are provided at the discharge positions for tilting the slats to discharge the parcels at their intended position. Code setting means are provided to enable one or more operators at a loading position to feed into the conveyor controller a destination code for each parcel and the control unit is operative to actuate the slat tilting mechanism associated with the required discharge position when the slats occupied by the particular parcel reach the intended destination.

In order to make full use of the capacity of the conveyor, the parcels should be fed to the conveyor in a regular continuous manner notwithstanding that there may be more than one loading position connected to the conveyor by a feeding device. Furthermore, space restrictions will normally require that the loading positions be positioned close together.

The present invention is concerned with a feeding device which is designed to provide a regular flow of articles to the conveyor and at the same time to enable a degree of compactness of the feeding device to be achieved.

According to the present invention, there is provided a feeding device for feeding articles to the main conveyor of a conveyor sorting system, the feeding device comprising at least two feed conveyors the paths of which merge with that of the main conveyor and which each incorporate a loading section provided with a detector which is responsive to the passage of articles through the loading section, the detectors of the respective loading sections being arranged so as to allow the passage of only one article past a detector at any one time and the detection zone of each detector extending across the associated loading section at an angle such that the time taken for an article leaving the detection zone to reach a zone extending across the main conveyor immediately downstream of the merging area formed by the feed conveyors and the main conveyor and normal to the direction of travel of the main conveyor is substantially the same irrespective of the lateral position of the article on the feed conveyor.

One embodiment of the invention will now be described by way of example with reference to the

accompanying drawings in which:

FIGURE 1 is a plan view of a feeding device of the invention, and

FIGURE 2 is a longitudinal sectional view of a feed conveyor forming part of the device of Figure 1.

Referring now to Figure 1, a feeding device for a parcel sorting machine comprises four feed conveyors 1-4 the paths of which merge with that of the main conveyor 5 of a parcel sorting machine. Each feed conveyor incorporates a curved section 6 and a linear section 7 which is upstream of the curved section and on which parcels to be sorted are loaded. In the case of the conveyors 1 and 4, the curved section is followed by a further linear section 8 and finally a substantially triangular section 9. In the case of the conveyors 2 and 3 a substantially triangular section 9 immediately follows the curved section 6. Each of the conveyor sections 6 to 8 consists of an endless belt passing around end rollers mounted in a housing supported on legs. Each of these sections is driven. The sections 9 consist of conveyor rollers 10 (see also Figure 2) mounted in a framework 11 which is supported on legs 12 and each terminates at the downstream end in an apron 13 which overlaps the conveyor 5. Furthermore each of the conveyors 1 and 4 has on the outside a side guide plate 21 which extends a short distance along the main conveyor, there being a gap between each guide plate and the conveyor belt. The rollers 10 are driven from a drive 14 via drive belt 15. Alternatively each section 9 may consist of a substantially triangular shaped belt passing around end rollers.

In front of each loading section 7 is a chute 16 (see also Figure 2) by means of which small items may be separated out. Adjacent each section 7 is an operators seat 17 and a coding device 18 by means of which a code indicative of the destination of each parcel loaded may be registered in a store forming part of a system for registering the codes of the parcels whilst on the feeding device. Each linear section 7 is also provided with a light source and photoelectric detector unit 19 which in each case forms in conjunction with the detectors of the other loading sections and a controller controlling the drives of the feed conveyors, a queuing and spacing system as will be described and which initiates entry of the previously stored parcel codes in a transfer memory forming part of the above mentioned registering system. In more detail the detectors 19 of the respective conveyors are each connected to a controller for the feeding device such that a parcel entering the detection zone of a particular detector may only continue past the detector at normal speed if firstly none of the other detectors is detecting the presence of a parcel and secondly the trailing edge of the last parcel to be released has travelled a sufficient distance for the ultimate parcel spacing on the parcel sorting machine to be correct. If these two conditions are not met then the conveyor section 7 carrying the first mentioned parcel is halted and only re-started when the previously released parcel has travelled the sufficient distance mentioned. Furthermore as each parcel passes through the

particular detector 19 the controller applies the code registered for that parcel to the aforementioned transfer memory. The codes in the transfer memory are advanced in synchronism with the speed of the conveyors 1-4.

As will be seen from Figure 1, the beam of each detector 21 is directed across the conveyor path of the particular section 7 at an angle and the purpose of this is to ensure that a parcel leaving the particular detector will reach a zone extending across the main conveyor immediately downstream of the merging area formed by the feed conveyors and the main conveyor and normal to the direction of travel of the main conveyor, in substantially the same time irrespective of the lateral position of the parcel on the feed conveyor.

A further light source and photoelectric detector unit 20 is provided on the main conveyor immediately downstream of the merging area to apply the code in the transfer memory corresponding to the parcel, to the controller of the parcel sorting machine.

In operation of the feeding device, the conveyor sections 6, 8 and 9 run continuously and at a speed such that the component of the speed of the sections 9 in the travelling direction of the machine 5 equals the speed of the machine 5. The loading sections 7 normally run at the speed of the sections 6 but are intermittently halted under the control of the detectors 19, as previously mentioned. Parcels are supplied from a source (not shown) to each operator who takes each parcel, reads the address and enters in the appropriate destination code on his coding device 17 which registers this code in the previously mentioned store. Thereafter the operator places the parcel on the loading section 7 of his feed conveyor which carries the parcel towards the associated detector 19. After passing through the detectors 21 the parcels proceed along the respective conveyors 1-4 to join the conveyor 5 in sequence and with the correct spacing. The purpose of the guide plates 21 is to assist the transfer of parcels lying on the outside of the conveyors 1 and 4 from those conveyors to the conveyor 5. The gaps between these plates and the conveyors should be chosen to suit particular conditions since too wide a gap may result in parcels (which then overhang the main conveyor) coming into contact with any ancillary equipment present on the side of the main conveyor and too narrow a gap may result in parcels tending to be dragged back.

On entering the conveyor 5, each parcel passes through the detector 20 which as previously mentioned applies the destination codes for the parcels to the sorting machine controller.

It will be seen that the above described feeding device provides a compact and yet reliable device for feeding parcels to a sorting machine, and in particular the disposition of the light sources and photoelectric detector units 21 serves to reduce the likelihood of mis-sorts.

CLAIMS

1. A feeding device for feeding articles to the main conveyor of a conveyor sorting system, the feeding device comprising at least two feed conveyors the paths of which merge with that of the main conveyor and which each incorporate a loading section pro-

vided with a detector which is responsive to the passage of articles through the loading section, the detectors of the respective loading sections being arranged so as to allow the passage of only one article past a detector at any one time and the detection zone of each detector extending across the associated loading section at an angle such that the time taken for an article leaving the detection zone to reach a zone extending across the main conveyor and normal to the direction of travel is substantially the same irrespective of the lateral position of the article on the feed conveyor.

2. A feeding device as claimed in claim 1, wherein each feed conveyor includes a substantially triangular conveyor section immediately adjacent the main conveyor.

3. A feeding device as claimed in claim 2, wherein each substantially triangular section terminates in an apron which overlaps the main conveyor.

4. A feeding device as claimed in claim 1, 2 or 3, wherein each feed conveyor incorporates a curved conveyor section downstream of the loading section.

5. A feeding device as claimed in claims 2 and 4, comprising four feed conveyors arranged in pairs on opposite sides of the main conveyor in which the outer feed conveyors comprise a further linear section between the curved section and the substantially triangular section.

6. A feeding device as claimed in claim 2 or any dependent claim thereof, wherein the substantially triangular section conveyor has on one side a guide plate which extends a short distance along the main conveyor and is spaced therefrom.

7. A feeding device as claimed in claim 2 or any dependent claim thereof, wherein the triangular sections are roller conveyors.

8. A feeding device as claimed in any preceding claim, wherein the detectors are photoelectric detectors.

9. A feeding device substantially as hereinbefore described with reference to the accompanying drawings.

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